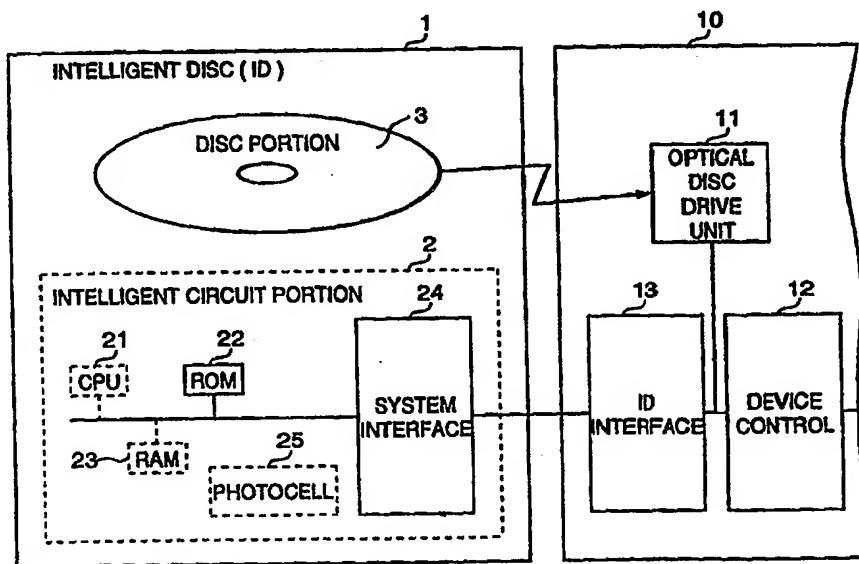




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ :	A1	(11) International Publication Number:	WO 98/58376
G11B 19/12, 23/30		(43) International Publication Date:	23 December 1998 (23.12.98)
(21) International Application Number:	PCT/JP98/02695	(81) Designated States:	AU, BR, CA, CN, CZ, GE, HU, ID, IL, KR, MX, NO, PL, RO, SG, SI, SK, TR, UA, UZ, VN, YU, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).
(22) International Filing Date:	18 June 1998 (18.06.98)		
(30) Priority Data:	9/161663 18 June 1997 (18.06.97) JP		
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(54) Title: RECORDING MEDIUM HAVING ELECTRONIC CIRCUIT AND METHOD FOR USING THEREOF



(57) Abstract

A recording medium including an electronic circuit which can exploit advantages of being able to easily provide control corresponding to characteristics of information stored in the information recording portion and a method for using such recording medium. An intelligent disc (1) includes a disc portion (3) for storing information and an intelligent circuit portion (2) for processing information. The information to be reproduced in an external device (10) is stored in the disc portion (3) and parameters for controlling reproduction of information in the external device (10), are stored in the intelligent circuit portion (2). The information is reproduced by the external device (10) using the parameters.

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DESCRIPTION

RECORDING MEDIUM HAVING ELECTRONIC CIRCUIT AND METHOD
FOR USING THEREOF

5

Technical Field

The present invention relates to a recording medium including information recording portions for storing information and an electronic circuit portion for processing information, for example, an optical disc including an electronic circuit portion (hereinafter called as an intelligent disc (ID)) and method for using the recording medium by defining roles of the information recording portion and the electronic circuit portion.

Background Art

Conventional recording mediums have been proposed such as discs, for example, CD-ROMs which have a chip for memory or CPU mounted on a cartridge or optical discs which have an electronic circuit or a microprocessor mounted on a part of them.

However, in such conventional recording mediums, in the case of the electronic circuit mounted on a cartridge, ID for a disc is stored and in the case of the electronic circuit mounted on an optical disc,

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programs stored on the disc surface are run in the electronic circuit but they tend to fail to establish sufficiently close connection between information stored on the disc surface and information stored in the 5 electronic circuit, so that they can not fully exploit advantages intrinsic to ID.

Disclosure of Invention

It is an object of the present invention to 10 provide a recording medium including an electronic circuit which can exploit advantages of being able to easily provide control corresponding to characteristics of information stored in the information recording portion, thus eliminating the defect of the prior art. 15 Another object of the invention is to provide a method for using such recording medium.

To solve the above issues the recording medium of the present invention comprises an information recording portion for storing information and an electronic 20 circuit portion for processing information, wherein the information to be reproduced in an external device is stored in the information recording portion and parameters for controlling reproduction of information in the external device is stored in the electronic 25 circuit portion.

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In this instance, a plurality of the information are stored within the information recording portion and a plurality of the parameters are stored in the electronic circuit portion corresponding to a plurality 5 of the information. Also, the electronic circuit portion further includes an examination means for examining characteristics of the external device. In one example, information to be reproduced in the external device is music information and the parameters 10 for controlling reproduction include mixing control data. In another example, information to be reproduced by the external device is image information and the parameters for controlling reproduction include gradation data and color tone data. In other example, information to be 15 reproduced by the external device is compressed information and the parameters for controlling reproduction include data on a compression format. Also, the recording medium is an optical disc.

The method for using the recording medium of the 20 present invention is a method for using a recording medium including an information recording portion for storing information and an electronic circuit portion for processing information, wherein information to be reproduced by an external device is stored in the 25 information recording portion and parameters for controlling reproduction of information by the external

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device is stored in the electronic circuit portion , comprising a step of reproducing information in the external device using the parameters.

In this instance, a plurality of the information
5 are stored within the information recording portion and a plurality of the parameters are stored in the electronic circuit portion corresponding to a plurality of the information, whereby, in the step of reproduction, the information is reproduced by the external device
10 using the parameters corresponding to the information.

Also, the electronic circuit portion further includes an examination means for examining characteristics of the external device, whereby the step of reproduction further includes a step of selecting the information and
15 the parameters suitable for the examined characteristics of the external device. Also, the recording medium is an optical disc.

Other objects and features of the present invention will be apparent from the following drawings
20 and detailed description of the preferred embodiment.

Brief Description of Drawings

FIG.1 is a drawing illustrating a plan view of an intelligent disc of an embodiment of the present
25 invention.

FIG.2 is a drawing illustrating an inner construction of the intelligent disc of an embodiment of the present invention.

5 FIG.3 is a drawing illustrating an audio equipment in an embodiment of the present invention.

FIG.4 is a drawing illustrating contents stored in an ID used in the audio equipment of FIG. 3.

FIG.5 is a drawing illustrating another embodiment of the present invention in a video-TV combination.

10 FIG.6 is a drawing illustrating contents stored in an ID used in the video-TV combination of FIG. 5.

FIG.7 is a drawing illustrating an example of storing compressed data in another embodiment of the present invention.

15 FIG.8 is a flow chart illustrating operational procedures in the video-TV combination in which the ID of the embodiment of the present invention works actively.

20 Best Mode for Carrying Out the Invention

A few embodiments of the present invention will be described in detail with reference to the drawings.

[An example of the ID construction of an embodiment]

FIG. 1 is a plan view of an intelligent optical disc which is a type of the ID and is an embodiment of the present invention. --

ID 1 comprises a disc portion 3 or a disc surface for storing information and an intelligent circuit portion 2 mounted, for example, as in FIG. 1 at the center of the disc. In this embodiment, as shown in FIG. 5 1, circuit portion 2 is located at the center of the disc but there is no limitation on how to locate the circuit portion and it may be arranged to totally occupy whole single side of a disc or may be embodied in one of a plurality of layers by constructing a disc in a form 10 of plurality of layers.

FIG. 2 is a drawing illustrating the concept of construction of ID 1 in conjunction of an external device 10.

In FIG. 2 an optical drive unit 11 is located in 15 the external device 10 and it includes a pick-up (not shown) for reading or writing of information to or from disc portion 3 or a surface of the ID and a pick-up drive circuit (not shown) for driving the pick-up to seek information on the disc surface. The intelligent 20 circuit portion 2 has a ROM 22 for storing fixed information as a minimum requirement but it may further includes a RAM 23 for temporary memory and a CPU 21 for running programs stored in ROM 22 and RAM 23, if required. A photocell 25 is provided as an independent 25 power source which is provided in case ID side is required to have such a source. --

The intelligent circuit portion 2 exchanges information with ID interface 13 of the external device 10 through a system interface 24. If the circuit portion 2 has no CPU 21 but only ROM 22 AND RAM 23, the 5 interface is controlled by the drive control 12 of the external device 10. The junction of the interface may be either of contact type or contactless type and also, may be either by bus coupling or by communication coupling. As for communication, either radio wave 10 communication or light communication may be suitable. However, in the present invention it is not intended to implement major modification on a conventional external device 10, and it is suffice to introduce a simple 15 system which is only required to add ID 1 to a conventional equipment.

[an example of an audio equipment using ID]

FIG. 3 illustrates an audio equipment as an example of a suitable application of the present invention. An audio equipment 30 has a conventional 20 construction except that it has an ID interface 13 in a CD-ROM drive.

In this case in the disc portion 3 of the ID 1 stored are data of a plurality of music pieces such as song 1, song 2 ...etc. to be selected out of addresses 25 stored in the directory as shown in the upper box of FIG. 4. On the other hand in ROM 22 or RAM 23 of the

electronic circuit portion 2 recorded are data for mixing of music pieces recorded in the disc portion 3, such as song 1 or song 2 as shown in the example 1 of the bottom boxes of FIG. 4, or parameters for 5 reproduction of the music pieces to be used before mixing operation, such as reproduction parameters for song 1 and song 2 etc., which are recorded corresponding to the music pieces in disc portion 3 as shown in the example 2 of the lower boxes of FIG. 4. Usually only a 10 repertoire of music pieces belonging to one musical category tends to be recorded on a disc, so that only one mixing control data or parameter may be stored in the electronic circuit portion 2 in many cases.

The drive control 12 or CPU 21, if it is included, 15 reads out a song and a mixing control data (mixing date in the specification) or a sound reproduction parameter corresponding to the feature of the song for conducting reproduction or mixing control matching to the song.

Depending on subjects of reproduction, such as 20 classical music, jazz or folk song, or such back-ground sounds as birds song or murmur of a brook, such characteristics of sound as intensity, frequency, crispness and quality, for example, are diversified and in the case of ensemble, a different manner of mixing 25 must be taken. In the present example, what kind of music is recorded in the disc part 3 is known at the --

time of recording and the best reproduction is achieved by memorizing, in the electronic circuit portion 2, the most appropriate parameters corresponding to the contents of recordings.

5 Setting of the parameters may be done on the side of the audio equipment as has been done in the conventional equipment. In such a case switching can be made between an auto operation mode for use of information in the ID circuit portion and manual
10 operation mode for use of a value set on the audio equipment.

[examples of application in video-TV combination and personal computer]

15 FIG. 5 shows another example of appropriate application of the present invention in a video-TV combination. A video-TV combination 50 has a conventional construction except that it has an ID interface 13 in a CD-ROM drive.

In this case in the disc portion 3 of the ID 1
20 stored are data of a plurality of image information such as image 1, image 2 etc. to be selected out of the addresses in a directory as shown in the upper box of FIG. 6. On the other hand in ROM 22 or RAM 23 of the electronic circuit portion 2 recorded are data for
25 indicating gradation or tone of color of images recorded -- in the disc portion 3, such as image 1 or image 2 etc.

as shown in the example 1 of the bottom boxes of FIG. 6, or parameters for reproduction of the images used in advance of adjustment operation on gradation or color tone, such as reproduction parameters for images 1 and 5 2 etc. which are recorded in correspondence to the images in the disc portion 3 as shown in the example 2 of FIG. 6. Similar to the case of an audio equipment, only one parameter may be recorded in the electronic circuit portion 2, if all the images in the disc portion 10 3 have similar characteristics.

Depending on the characteristics of subjects of reproduction, such as image, game software, character broadcasting for display of catalogues or text, CAD representation, or animation movies or other movies, 15 manner of processing of edge, color, scanning density, number of frames per second or the interlace operation can be diversified. In the present example, the best reproduction of images is achieved by memorizing, in the electronic circuit portion 2, the most appropriate 20 parameters for reproducing the contents of recordings depending on what kind of images are recorded in the disc portion 3 of the ID 1.

[example of storing into or retrieval out of ID of compressed data]

FIG. 7 shows examples of contents stored in an ID for recording compressed data including aforementioned music or image data.

In the upper box of FIG. 7 shown is the contents 5 stored in the disc portion 3 of ID 1, where the compressed data is stored to be selected out of the addresses in a directory for reproduction. In ROM 22 or RAM 23 of the electronic circuit portion 2 of ID 1 recorded are data on the compression-decompression 10 system of the compressed data or parameters required for compression-decompression operation as shown in the lower box in FIG. 7. By this construction, if compression parameters is formatted in a cipher, the compressed data in the disc portion 3 can not be 15 retrieved without knowing corresponding information in electronic circuit portion 2, thus enabling to keep confidentiality or to prevent copying of the data stored in the disc portion 3.

[example of an active ID system]

20 FIG. 8 shows an example of operational procedures for a video-TV combination in which the electronic circuit portion 2 of ID 1 has a CPU 21 for active operation.

In step S81 CPU 21 of electronic circuit portion 2 25 of ID 1 determines if ID 1 is inserted in ID drive or not. --

If inserted, the procedure goes to step S82 for checking information relating to difference on display control, such as model number, characteristics, manufacturer of the video-TV combination being used as 5 the external device.

In step S83 image data and parameters appropriate to characteristics of the video-TV combination 50 are selected from image data stored in the disc portion 3 and/or parameters stored in the electronic circuit portion 2 to start reproduction in step S84. 10

In conjunction of image data selection, a plurality of images on the same story are recorded which are treated with various manners of processing. It is possible to store digital and analogue images, for 15 example, corresponding to output devices. To cope with similar type of products of the video-TV combination 50, it may suffice to arrange to record only one kind of image, while parameters should be adapted to correspond to models to be used.

20 A few examples of application of the present invention are presented in the description of embodiments but the present invention is intended to give a tip on how to use ID appropriately and it has concepts including other concrete applications.

25 The present invention thus provides a recording medium including an electronic circuit which can exploit --

advantages of being able to easily provide control corresponding to characteristics of information stored in the information recording portion and a method for using such recording medium.

5 The present invention is described referring to the preferred embodiments but it should be understood that the present invention is not limited to the specific embodiments described in this specification. To the contrary, the present invention is intended to
10 cover various modifications and equivalent arrangements included within the spirit and scope of the claims.

CLAIMS

1. A recording medium, comprising:
 - an information recording portion for storing
 - 5 information, and
 - an electronic circuit portion for processing information, wherein the information to be reproduced by an external device is stored in said information recording portion and parameters for controlling
 - 10 reproduction of the information in said external device is stored in said electronic circuit portion.
2. A recording medium according to claim 1, wherein a plurality of said information are stored within said
- 15 information recording portion and a plurality of said parameters are stored in said electronic circuit portion corresponding to a plurality of said information.
3. A recording medium according to claim 1, wherein
- 20 said electronic circuit portion further includes an examination means for examining characteristics of said external device.
4. A recording medium according to claim 1, wherein
- 25 information to be reproduced in said external device is music information and said parameters for controlling sound reproduction include mixing control data. --

5. A recording medium according to claim 1, wherein
said information to be reproduced in said external
device is image information and said parameters for
5 controlling image reproduction include gradation data
and/or color tone data.

6. A recording medium according to claim 1, wherein
information to be reproduced in said external device is
10 compressed information and said parameters for
controlling reproduction include data on the compression
format.

7. A recording medium according to claim 1, wherein
15 said recording medium is an optical disc.

8. A method for using a recording medium including
information recording portion for storing information
and an electronic circuit portion for processing
20 information, wherein information to be reproduced by an
external device is stored in said information recording
portion and parameters for controlling reproduction of
information in said external device is stored in said
electronic circuit portion, comprising a step of
25 reproducing said information in said external device
using said parameters.

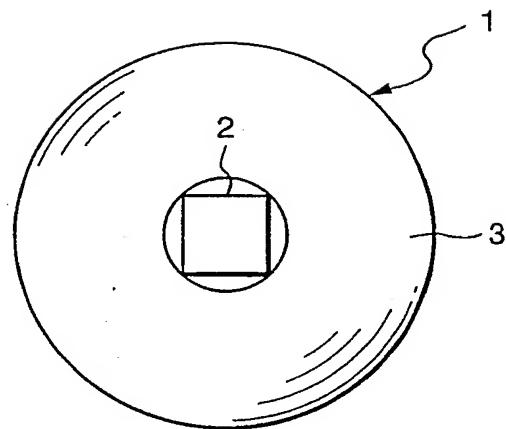
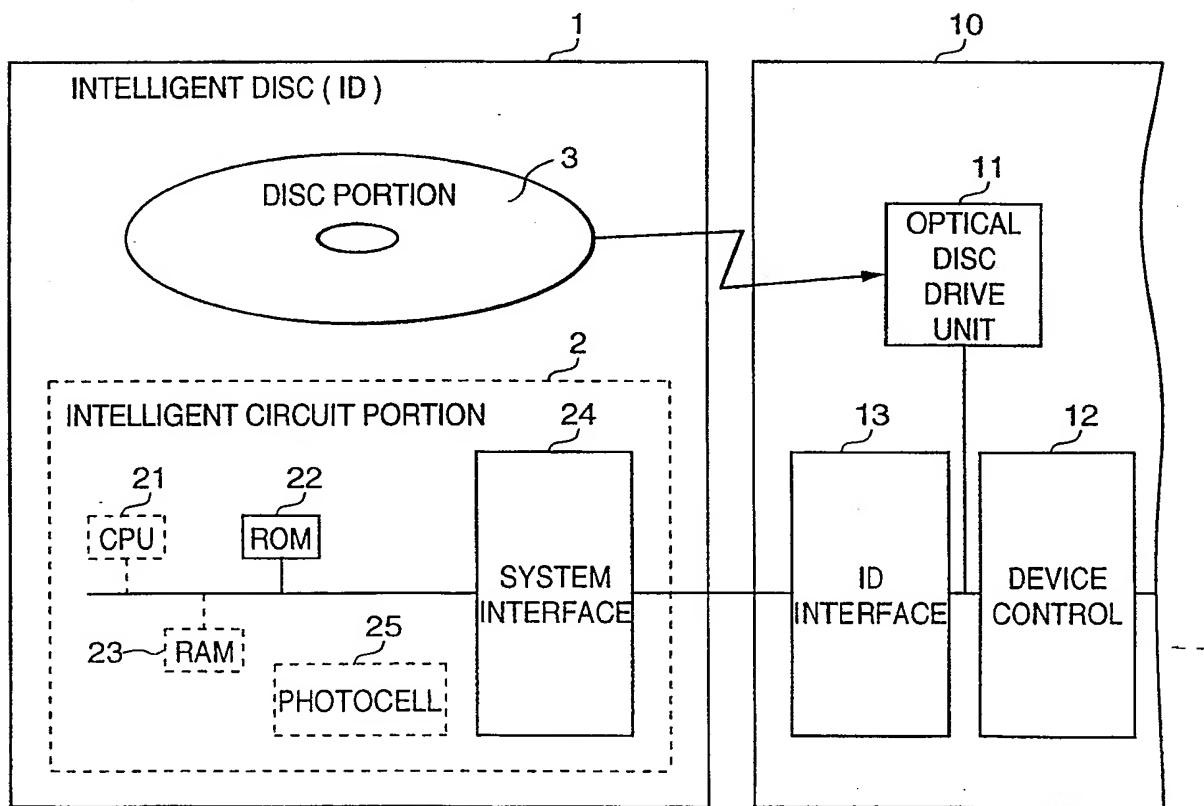
--

9. A method for using a recording medium according to
claim 8, wherein a plurality of said information are
stored within said information recording portion and a
5 plurality of said parameters are stored in said
electronic circuit portion corresponding to a plurality
of said information, whereby in said step of
reproduction said information is reproduced in said
external device using said parameters corresponding to
10 said information.

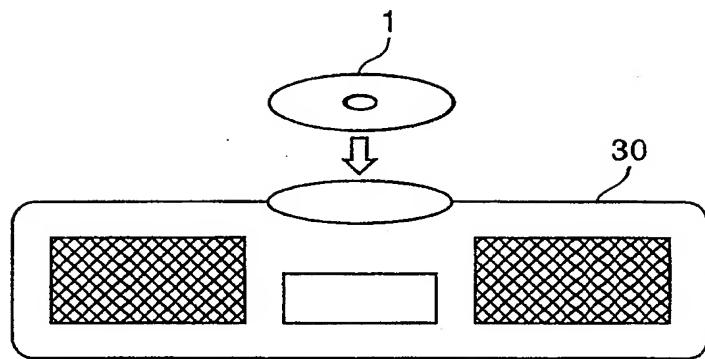
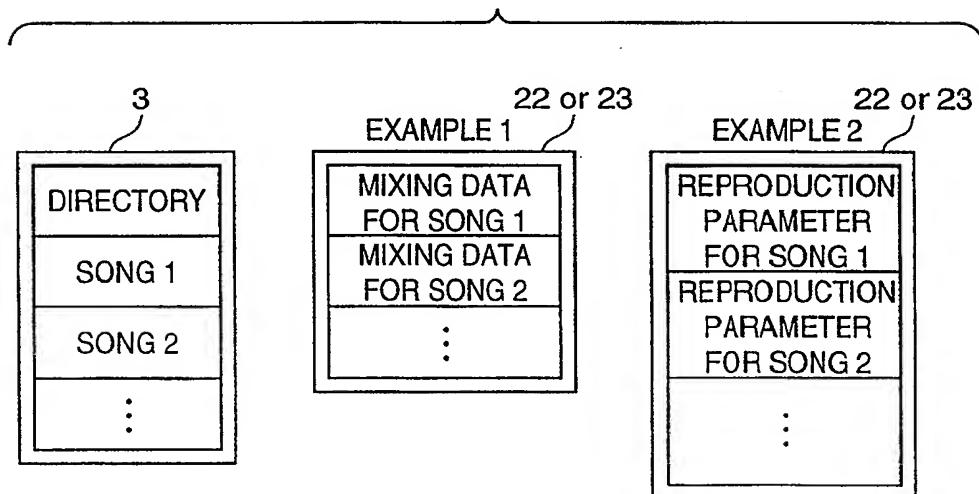
10. A method for using a recording medium according to
claim 9, wherein, said electronic circuit portion
further includes an examination means for examining
15 characteristics of said external device, whereby said
step of reproduction further includes a step of
selecting said information and parameters suitable for
examined characteristics of said external device.

20 11. A method for using a recording medium according to
claim 8, wherein, said recording medium is an optical
disc.

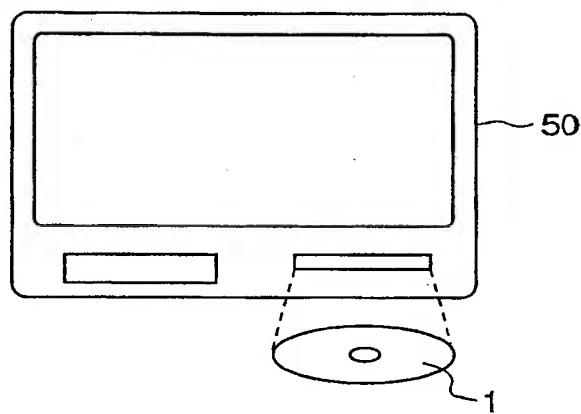
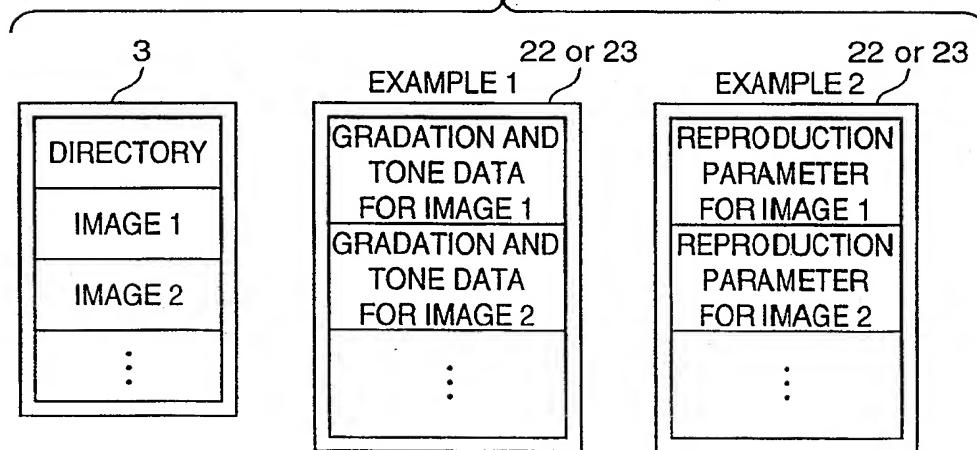
1/5

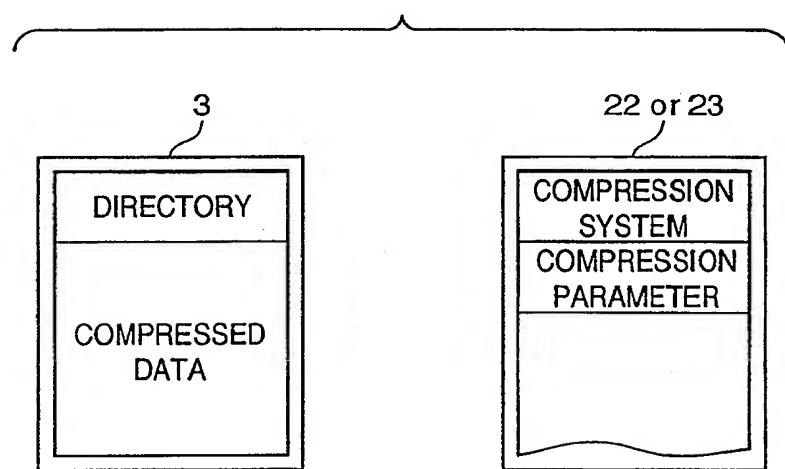
F I G. 1**F I G. 2**

2/5

F I G. 3**F I G. 4**

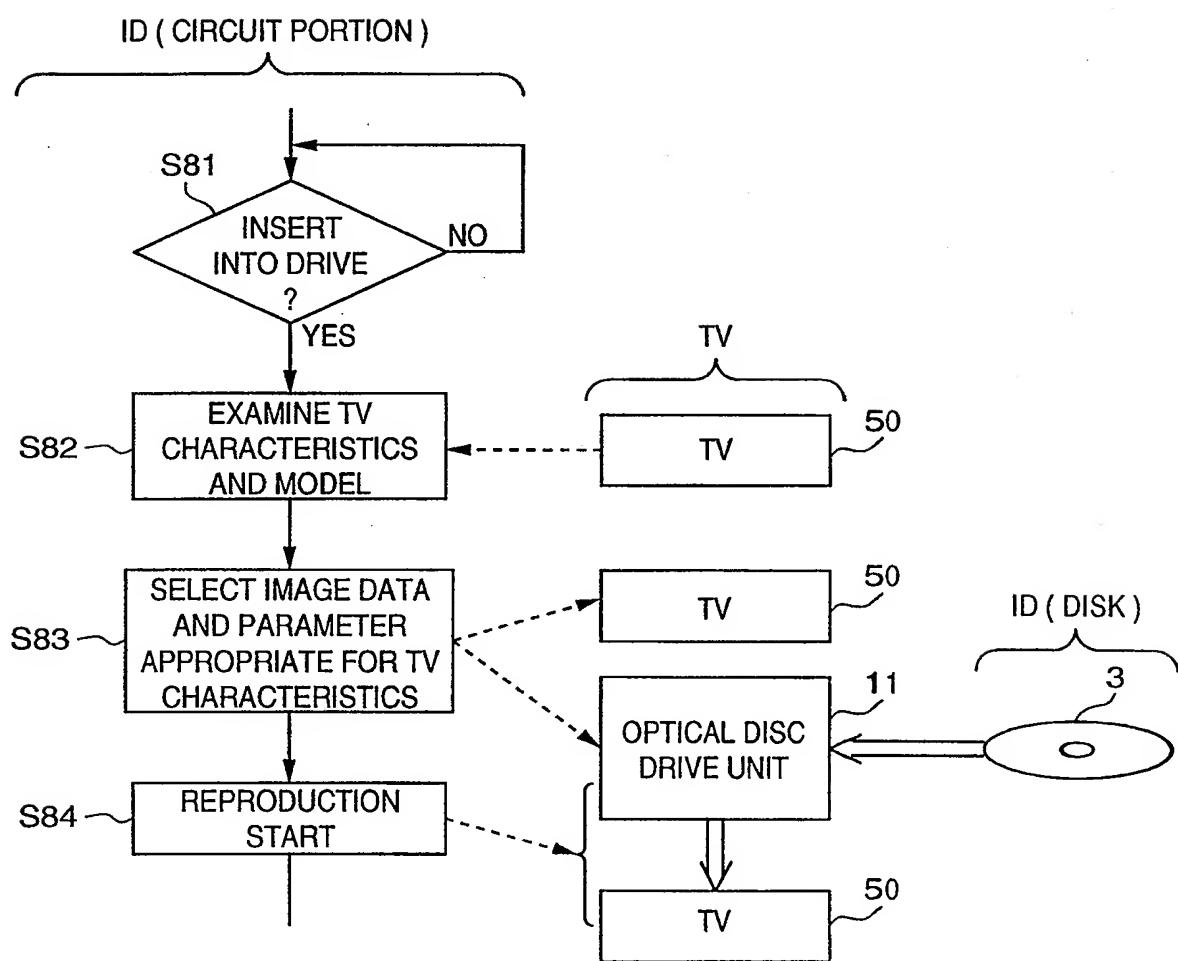
3/5

F I G. 5**F I G. 6**

F I G. 7

5/5

FIG. 8



INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 98/02695

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G11B19/12 G11B23/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 119 353 A (ASAKURA TORU) 2 June 1992	1,2,7-9, 11
A	see column 3, line 20 - column 5, line 23; figure 1 ---	3
X	PATENT ABSTRACTS OF JAPAN vol. 012, no. 140 (P-696), 28 April 1988 & JP 62 262289 A (BROTHER IND LTD), 14 November 1987, see abstract ---	1,2,7-9, 11
A	US 4 868 373 A (THOMAS GARY E ET AL) 19 September 1989 see abstract ---	3
A	US 4 868 373 A (THOMAS GARY E ET AL) 19 September 1989 see abstract ---	1-3,7-9, 11
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

11 September 1998

Date of mailing of the international search report

02.10.98

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Poth, H

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 98/02695

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PATENT ABSTRACTS OF JAPAN vol. 097, no. 005, 30 May 1997 & JP 09 017154 A (NEC SHIZUOKA LTD), 17 January 1997, see abstract ---	1-3,7-9, 11
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 033 (P-334), 13 February 1985 & JP 59 175062 A (NIPPON VICTOR KK), 3 October 1984, see abstract -----	3,10

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Claims Nos.: 4,5,6

Claim 4 being dependent on claim 1 stipulates particular information in the information recording portion and parameters in the electronic circuit portion, namely music information and mixing control data respectively (catchword "music information mixing control").

Claim 5 being also dependent on claim 1 stipulates instead image information and parameters controlling gradation and/or colour tone data (catchword "image information editing control").

Claim 6 being also dependent on claim 1 stipulates instead in general compressed information and parameters controlling the reproduction of the compressed information (catchword "compressed information reproduction parameters").

All said claims do not stipulate additional technical features. Hence, all said claims refer merely to presentations of information within the meaning of Art.17(2)(a)(i), and, consequently, their subject-matters are not to be searched by virtue of R.39.1(v).

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP 98/02695

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: 4, 5, 6 because they relate to subject matter not required to be searched by this Authority, namely:
see FURTHER INFORMATION sheet PCT/ISA/210
2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 98/02695

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		JP	62145589 A	29-06-1987